

Official Stamp of Attendance Goes Here

Student Notes
Science on Saturday
Lawrence Livermore National Laboratory
February 16, 2008

**Our Dark and Messy Universe:
How One Particle Could Light the Way**

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Goals: Students will learn about cosmology, and the discovery of dark matter, matter pervading the Universe that we have not been able to detect directly, but we can infer its existence from its gravitational effect on matter we *can* see. Students will also explore how dark matter may be composed of unimaginably tiny particles called *axions*, and how scientists at Lawrence Livermore National Laboratory have constructed a device designed to detect these elusive, hypothetical particles.

Questions: You will be able to answer the following questions at the end of this presentation:

- What is cosmology?
- What has modern cosmology taught us?
- How was “dark matter” discovered, and what might it be?
- How are Livermore Lab scientists trying to detect elusive particles which could be the primary components of dark matter?

Presentation Outline:

1. What is meant by the term *cosmology*? _____

2. What advantages do we have over our ancestors that allow us to better understand the Universe? _____

3. What major discovery early in the 20th Century radically changed our view of the Universe, and our place in it? _____

4. What did Edwin Hubble discover about the distance to other galaxies and their speed? _____

5. True/False: We lie at the center of the Universe.
6. True/False: There *is* a center of the Universe.
7. Where did the Big Bang happen? _____